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ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

DIVISION OF WATER POLLUTION CONTROL

CRITERIA FOR DETERMINING CONSTRUCTION GRANT PRIORITIES FOR MUNICIPAL SEWAGE TREATMENT WORKS NEEDS

FISCAL YEAR 1979

EFFECTIVE DATE
JULY 1, 1978

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APRIL, 1978

0.0 INTRODUCTION

0.1 Filing of Pre-Applications and Priority Scoring Summaries

A community which has a need for a sewage treatment works improvement files a pre-application and a priority scoring summary (reference Appendix A) with the Illinois Environmental Protection Agency (Agency), at any time during the year.

0.1.1 Agency Action

The Agency assigns a number to the pre-application and reviews the priority scoring summary to verify that the summary has been completed in accordance with the criteria contained herein. Then, at the time of preparation of the preliminary priority list, the Agency enters the need on the list.

0.1.2 Publication of the Priority List

The Agency publishes the preliminary priority list once each year in connection with the annual hearings on the Agency's Water Pollution Control Plan. Following the hearings, the Agency may modify the preliminary list in response to public comment received at the hearings and the Agency then submits the final priority list to the United States Environmental Protection Agency (USEPA) for approval.

0.1.3 Renewal of Pre-applications and Priority Scoring Summaries

A community is not required to renew a pre-application or a priority scoring summary unless the scope, schedule, scoring data or grant request differs from that of the previous year, and unless the community has not yet advised the Agency of the changes.

0.2 Segment Ranking Index and Municipal Discharge Index and Grant Priority Index

0.2.1 Segment Ranking Index (SRI)

Federal regulations (40 CFR 130.20(a)(2)) require the Agency to annually prepare a State River Basin Segment Ranking.

The procedures for determining SRI values IS CONTAINED IN APPENDIX C.

0.2.2 Municipal Discharge Index (MDI)

FEDERAL REGULATIONS 40 CFR 35.915(b) REQUIRE THAT A STATE MAINTAIN A LISTING OF ALL NEEDED TREATMENT WORKS, A "STATE NEEDS INVENTORY". AS WAS REQUIRED PREVIOUSLY (40 CFR 35.915(c)(1) OF THE FEBRUARY 11, 1974 CONSTRUCTION GRANT REGULATIONS) FOR THE MUNICIPAL DISCHARGE INVENTORY, THE STATE PROJECT PRIORITY LIST MUST BE CONSISTENT WITH THE STATE NEEDS INVENTORY. FOR PURPOSES OF THESE "CRITERIA", THE TERM MUNICIPAL DISCHARGE INDEX (MDI) WILL CONTINUE TO BE USED AS THE QUANTITY WHICH IS USED TO DERIVE WHAT IS NOW TERMED THE STATE NEEDS INVENTORY, AND THAT WILL CONTINUE TO BE IDENTIFIED BY THE TERM MUNICIPAL DISCHARGE INVENTORY.

As the first step in developing the Municipal Discharge Inventory it was necessary to define a "significant municipal discharger". The definition which has been developed is based on the concept of eligibility for Federal grant assistance for construction of facilities required to prevent water pollution by the discharge. Sewerage utilities and privately-owned subdivision sewage treatment plants have been omitted from the inventory since they are not eligible for grants.

The procedure for determining MDI values is contained in Section 1.0 of these criteria.

0.2.3 Grant Priority Index (GPI)

FEDERAL REGULATIONS FOR CRITERIA FOR DETERMINING PRIORITIES (40 CFR 35.915(a)(1)) STATE THAT "...THE STATE SHALL CONSIDER: (A) THE SEVERITY OF THE POLLUTION PROBLEM; (B) THE EXISTING POPULATION AFFECTED; (C) THE NEED FOR PRESERVATION OF HIGH QUALITY WATERS; AND (D) AT THE STATE'S OPTION, THE SPECIFIC CATEGORY OF NEED THAT IS ADDRESSED." IN ADDITION THE REGULATIONS REQUIRE (40 CFR 35.915(c)(1)) THAT "...STATES MUST ALSO CONSIDER THE TREATMENT WORKS AND STEP SEQUENCE; THE ALLOTMENT DEADLINE; TOTAL FUNDS AVAILABLE; AND OTHER MANAGEMENT CRITERIA DELINEATED IN THE APPROVED STATE PRIORITY SYSTEM."

The procedures for determining GPI values is contained in Section 2.0 of these criteria.

0.3 Prerequisites for Grant in Addition to Priority

In addition to the Criteria for determining SRI, MDI, and GPI values, even though a need may appear on the priority list prepared in accordance with these criteria, a number of conditions must be met before the project(s) will be unconditionally certified to the United States Environmental Protection Agency as entitled to priority for award of grant:

0.3.1 The grant pre-application must have been filed prior to the March 1 deadline by an eligible unit of government in a manner consistent with procedures required by the Agency. (Reference Appendix A.) The only exceptions to this pre-application filing requirement are that, for needs which were not included in preapplications which were previously filed, if:

  0.3.1.1 the needs were subsequently defined in a facility plan or municipal needs analysis, or if

  0.3.1.2 the needs can be anticipated from the results of a field inspection by Agency staff.

0.3.2 The grant application, facilities planning (Step 1), design (Step 2), or construction (Step 3) must comply with all applicable requirements set forth in 40 CFR 35 E. In particular, all grant applicants must satisfy all applicable facilities planning requirements, including sewer system evaluation requirements, prior to unconditional certification for Step 2 or Step 3 grant.

0.3.3 The grant applicant must have applied for any necessary National Pollutant Discharge Elimination System Permit (NPDES Permit).

0.3.4 No grant or combination of grants will be certified in an amount which will allow a single applicant or a service area of a single applicant to receive more than 50 percent of the available Federal and State Grant funds, unless such an award or combination of awards is deemed by the Director of the Agency to be in the best iterests of the citizens of Illinois.

0.4 Applicant Progress

0.4.1 Satisfactory Progress

Needs on the approved priority list for which Federal or State funds are available at the time of USEPA approval of the list (after deduction of the reserves specified in

Section 0.5 below) to provide funding through Step 3 will retain their priority position until a Step 3 grant has been awarded, or until the need represented by that priority rank has been satisfied, provided that the applicant is progressing in a satisfactory manner toward satisfying the applicable grant applicant requirements of 40 CFR 35 E. Beginning with the fiscal year 1979 priority list, an exception to this provision to retain priorities will be brought about for needs of unsewered communities by the inclusion of the F6 factor to priority computations (reference Section 2.2.2).

0.4.2 Unsatisfactory Progress

To prevent the possible loss of Federal funds to the State, provisions will be made to obligate those Federal funds allocated to the State which may be jeopardized by lack of progress by applicants which have high priority projects. The provisions may include amending the project priority list by deleting and/or adding projects.

Also, provision will be made to amend the priority list to set F5 equal to zero for any project which does not progress in a satisfactory manner toward complying with the applicable grant application requirements of 40 CFR 35 E, in particular 40 CFR 35.917-6 regarding applicant assurances that the facility plan will be implemented and 40 CFR 35.925-5 regarding applicant assurances to pay the non-grant costs and applicant demonstration of legal, institutional, managerial, and financial capability to insure facility plan implementation.

0.5 Reserves

0.5.1 Grant Increases

As required by the provisions of 40 CFR 35.915-1(d), a reserve of no less than five percent (5%) of each fiscal year's allotment of Federal funds will be established for use in funding of grant increases. The amount of this reserve will be specified in the Agency's annual Water Pollution Control Program, and may be amended as necessary.

0.5.2 Step 1 and Step 2 Grants

Pursuant to the provisions of 40 CFR 35.915-1(d), the Agency may establish a reserve (which, taken together with any reserve under Section 0.5.2 hereof, must not exceed ten percent (10%) of the current year allotment) for use in advanced funding of Step 1 and Step 2 for needs for which Step 3 funds may not yet be available. The amount of this reserve, if established, will be specified for each fiscal year's allotment of federal funds, beginning with FY 1975, by a statement contained in the Agency's annual Water Pollution Control Program Plan, and may be amended as necessary.

Applicants which have needs which receive such advanced funding and which progress in a satisfactory manner (reference Section 0.4) shall retain their priority position through award of Step 3 grant or until the need represented by that priority rank has been satisfied.

Such advance funding will be awarded in the same manner as grants for high-priority needs which receive comment of funds through Step 3, except that commitment of funds through Step 3 will be contingent upon future availability of adequate Federal allotments and/or State appropriations.

The Agency reserves the option to withhold such advanced Step 2 funding for unsewered communities by use of the F6 factor in accordance with Section 2.2.2.

0.5.3 Step 1 Grants

Pursuant to the provisions of 40 CFR 35.915-1(d), the Agency may establish a reserve (which, taken together with any reserve under Section 0.5.3 hereof, must not exceed 10% of the current year allotment) for use in advanced funding of Step 1 for needs for which Step 2 and Step 3 funds may not yet be available. The amount of this reserve, if established, will be specified for each fiscal year's allotment of federal funds, beginning with FY 1975, by a statement contained in the Agency's annual Water Pollution Control Program Plan, and may be amended as necessary.

Applicants which have needs which receive such advanced funding shall not retain their priority position through award of Step 3 funding unless:

0.5.3.1 Funding for Step 2 becomes available in addition to funding for Step 1, and

0.5.3.2 the applicant progresses in a satisfactory manner (reference Section 0.4).

Such advanced funding will be awarded in the same manner as grants for high-priority needs which receive commitment of funds through Step 3 except that commitment of funds through Step 3 will be contingent upon future availability of adequate Federal allotments and/or State appropriations.

The Agency reserves the option to withhold such advanced Step 2 funding for needs for unsewered communities by use of the F6 factor in accordance with Section 2.2.2.

0.5.4 ALTERNATIVE AND INNOVATIVE TECHNOLOGY

IN ACCORDANCE WITH 40 CFR 35.915-1(b), 2% OF THE ANNUAL ALLOCATIONS FOR FEDERAL FISCAL YEARS 1979 AND 1980 AND 3% OF THE ALLOCATION FOR FEDERAL FISCAL YEAR 1981 MUST BE SET-ASIDE FOR INCREASING GRANTS FROM 75% TO 85% FOR DESIGN AND CONSTRUCTION PROJECTS WHICH WILL UTILIZE ALTERNATIVE OR INNOVATIVE TECHNOLOGY. A MINIMUM OF 1/2% MUST BE UTILIZED FOR INNOVATIVE TECHNOLOGY AND THE REMAINDER OF THE 2% OR 3% MUST BE UTILIZED FOR PROJECTS UTILIZING INNOVATIVE OR ALTERNATIVE TECHNOLOGY. IN ILLINOIS, THESE 85% GRANTS WILL BE AVAILABLE IRRESPECTIVE OF PRIORITY OF THE PROJECT, UNTIL THE SET-ASIDE IS UTILIZED OR THE POOL OF PROJECTS IS EXHAUSTED.

0.5.5 STATE MANAGEMENT ASSISTANCE GRANT

IN ACCORDANCE WITH 40 CFR 35.915-1(a), A SET-ASIDE MAY BE ESTABLISHED OUT OF EACH ALLOCATION FOR A GRANT TO THE AGENCY FOR MANAGEMENT OF THE SEWAGE TREATMENT WORKS CONSTRUCTION GRANT PROGRAM, AND THE AMOUNT OF THE SET-ASIDE CANNOT EXCEED 2% OF THE ANNUAL ALLOCATION. THE AMOUNT OF THE SET-ASIDE WILL BE TENTATIVELY ESTABLISHED EACH YEAR IN THE PROGRAM PLAN AND MAY BE MODIFIED DURING EACH YEAR.

0.6 Previous Criteria for Determining Priorities

0.6.1. The Criteria for determining SRI values, as well as the SRI values, are identical to the criteria and values for Fiscal Year 1977.

0.6.2 The Criteria for determining MDI values (reference Section 1.0) are identical to the criteria which were used in the determination of these values for Fiscal Year 1978 with the exception of the sections of these criteria which refer to the significance factor, municipal needs analyses and miscellaneous clarifications, all of which were discussed at public hearings in January, 1978. OTHER CHANGES SINCE THEN ARE IDENTIFIED IN THIS DOCUMENT THROUGH THE USE OF CAPITAL LETTERS.

0.6.3. The Criteria for determining GPI values (reference Section 2.0) are identical to the criteria which were used in the determination of these values for Fiscal Year 1978 with the exception of the sections of these criteria which refer to the significance factor, municipal needs analyses and miscellaneous clarifications, all of which were discussed at public hearings in January, 1978. OTHER CHANGES SINCE THEN ARE IDENTIFIED IN THIS DOCUMENT THROUGH THE USE OF CAPITAL LETTERS.

1.0 PROCEDURE FOR CALCULATING THE MUNICIPAL DISCHARGE INDICES (MDI)

1.1 Concept of the Municipal Discharge Index

In order to carry out the ranking of municipal dischargers, a quantitative formula has been developed which incorporates three considerations for accomplishing the ranking of discharges: (1) quantity of wastewater adjusted for strength; (2) adequacy of existing facilities for treating the existing wastewater load to design level; and (3) adjusted segment ranking index (SRI).

1.2 Specific Formula for the Municipal Discharge Index

The specific formula which considers these three factors is designed to produce a MDI value which becomes an important determinant of priority for grant assistance to the discharger. The forumula is as follows:

1.2.1. F1 = Discharge Quantity Factor

$$= \log_{10} (\text{P.E.}^{*}_{\text{BOD}}, \text{ existing load})^{**}$$

1.2.2 F2 = Existing Facility Adequacy Factor

$$= \frac{\text{P.E.}^{*}_{\text{BOD}}, \text{ existing load (industrial \& domestic)}^{**}}{\text{P.E.}^{*}_{\text{BOD}}, \text{ existing design capacity}}$$

$$\text{X} \; \frac{\text{daily average flow, existing load}^{**}}{\text{daily average flow, existing design capacity}} + 1$$

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* 1 PE_{BOD} = 0.17 lbs. of 5-day biochemical oxygen demand per day.

** Where the applicant justified hydraulic and organic loadings on the basis of influent sampling and flow measurement results for a current 12 month period these justified values will be used. In cases where influent sampling and/or flow measurement results are not available for a current 12 month period and where the applicant justifies estimated connected domestic PE and provides (measured) industrial PE and/or where the applicant provides estimated flow based on 100 gpcpd and provides (measured) industrial flow, these justified values will be used.

1.2.3 F3 = Adjusted Segment Ranking Index

$$= \frac{\text{SRI, receiving segment}}{\text{SRI, maximum statewide value}}$$

1.2.4 F6 = significance factor

The F6 factor is determined as follows:

1.2.4.1 The municipality/applicant has an existing sewage collection system and sewage treatment plant: except for a storm sewer or flood control need (in which case F6 shall be computed via the procedures described in 1.2.4.2.):

F6 = 1.0

OR

1.2.4.2 The municipality/applicant is a currently unsewered community, has no central treatment facility, or has a need for a storm sewer or flood control only: in this case, there is a two step process for which F6 values are assigned on two separate occasions.

1) At submittal of a pre-application form for priority, and

2) at completion of facilities planning (Step 1).

The points assigned for each municipality/applicant under this Section 1.2.4.2 cannot exceed 1.0 in total and are determined as follows:

1.2.4.2.1 At the time of submittal of a pre-application form for setting of priority, a F6 of 1.0 is assigned.

Note: F2 of 2 for pollutional discharge (reference Section 2.4.1.4) should not be given until end of facility planning.

1.2.4.2.2 Upon completion of the facilities plan and Agency review and approval, the F6 factor is reevaluated. F 6 cumulative points are then assigned as follows:

1. If after completion and approval of the facilities plan, no points are assigned based on 2, 3, 4, 5 and 6 below, F6 shall equal 0.

2. One or more discharges which are not complying with an effluent standard of 30 mg/l BOD and 30 mg/l suspended solids shall result in an additional 0.1 point.

3. Polluted* aquatic environment in receiving stream down stream of discharge(s) from drainage tiles serving community.

   Points shall be given as follows: 0.1 point for each full 600 feet of stream degraded to a polluted* environment as a result of the municipality's/applicant's activities.

4. Semi-polluted* aquatic environment in the receiving stream down stream of discharge(s) from drainage tiles serving the community.

   Points shall be given as follows: 0.075 point for each 600 feet of stream degraded as a result of said discharge(s) to a semi-polluted* environment as a result of the municipality's/applicant's activities.

5. Unbalanced* aquatic environment in the receiving stream down stream of discharge(s) from drainage tiles serving the community.

   Points shall be given as follows: 0.05 point for each full 600 feet of stream degraded as a result of said discharge(s) to an unbalanced* environment as a result of the municipality's/applicant's activities.

6. Points, from 0.0 to 1.0, shall be given for health hazards in the municipality/community in question resulting from malfunctioning or inadequate private sewage disposal systems. Assignment of points shall be based upon:

   Severity and overall distribution of the health hazard as judged based on the content of the facilities plan and field investigations of Illinois Environmental Protection Agency in cooperation with the Illinois Department of Public Health, and,

The legal, financial, institutional and managerial capability of the applicant to implement the facility plan.

Additional Criteria for Setting Health Hazard and, Where Appropriate, Water Quality Points.

1. Points are assigned by the Manager of the Division of Water Pollution Control.

2. Applicants will be notified by registered mail of the points assigned.

3. If the applicant wishes to appeal the points assigned in this fashion, said appeal must be received by the Director of the Illinois Environmental Protection Agency within 30 days of the date received by the applicant.

4. The Director of the Illinois Environmental Protection Agency will make the final decision regarding the merits of the applicant's appeal.

The above points allowed for extent of stream affected and health hazards are cumulative. Multiple discharges can result in multiple 600 feet long sections of stream being degraded. If insufficient data is available to properly score items 3, 4 and 5 of Section 1.2.4.2.2 above, they will be set equal to zero.

1.2.4.3 *The classifications presently used by the Illinois Environmental Protection Agency to evaluate stream environments are:

1.2.4.3.1 Balanced environment: Intolerant organisms are many in number and species, or more in numbers than other forms present.

Intolerant	Moderate, facultative and
Present > 50%	Tolerant usually present < 50%

1.2.4.3.2 Unbalanced environment: Intolerant organisms are less in number than other forms combined, but combined with moderate forms, they usually outnumber tolerant forms.

Intolerant	Moderate, facultative and
Present < 50% But < 10%.	Tolerant usually present but > 50%

1.2.4.3.3 Semi-polluted environment: Intolerant organisms are few or may not be present. Moderate and/or facultative organisms present.

Intolerant	Moderate, facultative and
Present $<$ 10%	Tolerant usually present $>$ 90%

1.2.4.3.4 Polluted environment: Intolerant organisms absent, only tolerant organisms present or no organisms present.

Tolerant present 100%*.

Organisms which are not adapted to inhabit a polluted environment are occasionally collected as a result of factors produced by the drift and are not representative.

1.2.5 MDI = Municipal Discharge Index

$= F1 \times F2 \times F3 \times F6$

1.3 Range of Values of the MDI for FY 1979

According to this formula, the "worst" municipal discharge is identified by the largest MDI value of ______ and the municipal discharge least in need of attention from the Agency is the one whose MDI value is __.

The range of values for the components of the MDI are:

F1: ______ to ______
F2: ______ to ______
SRI: ______ to ______
F3: ______ to ______
F6: 0 to 1

2.0 PROCEDURE FOR CALCULATING THE GRANT PRIORITY INDICES (GPI)

2.1 Concept of the Grant Priority Index

The MDI value derived by the procedure previously described is used as an input to a formula which produces a "Grant Priority Index" for each need. To derive a Grant Priority Index (GPI) value, it is also necessary to consider the corrective measures required to provide the degree of treatment needed for meeting State effluent standards or other effluent limitations. This is accomplished through a scoring procedure which:

2.1.1 establishes relative values for: secondary, tertiary, advanced and supplemental treatment processes for the treatment of average daily dry weather flow and maximum daily dry weather flow; primary treatment and disinfection of maximum wet weather flow; modification of existing processes; expansion of sludge disposal facilities; flood control facilities and trunk and lateral sewers

2.1.2 assigns the established values for:

2.1.2.1 addition of any required secondary and/or supplemental treatment processes where, at the present time, the required processes are non-existent. The additional treatment processes required would be determined based on the following dilution ratios:

Dilution Ratio	Processes Required*
Greater than 5:1	Primary, Secondary
Greater than 1:1 and less than 5:1	Primary, Secondary, Tertiary, Nitrification
Less than 1:1	Primary, Secondary, Tertiary, Advanced, Nitrification;

UNLESS,

AN EXEMPTION HAS BEEN ISSUED BY THE AGENCY UNDER RULE 404(f) OF THE WATER POLLUTION REGULATIONS OF THE ILLINOIS POLLUTION CONTROL BOARD. IN SUCH CASES, THE "PROCESSES REQUIRED" WOULD BE PRIMARY, SECONDARY (FOR THE CASE OF A LAGOON EXEMPTION) OR PRIMARY SECONDARY, TERTIARY, NITRIFICATION (FOR THE CASE OF A PFEFFER EXEMPTION). HOWEVER, F4 VALUES ASSIGNED PRIOR TO MARCH, 1978 WILL NOT BE REDUCED TO ACCOUNT FOR ISSUANCE OF EXEMPTIONS UNDER RULE 404(f).

2.1.2.2 additional capacity for currently (hydraulically and/or organically) overloaded treatment processes: If the average daily flow or the connected population equivalent (for a 12 month period) exceeds the design of any of the treatment processes (exclusive of sludge beds), the entire treatment plant will be classified as overloaded.

*Some needs may also require phosphorus removal or nitrification regardless of their dilution ratio.

2.1.2.3 needs which involve the upgrading of existing treatment plant will be credited with one point for "Modifications of existing processes which do not increase capacity or degree of treatment".

2.1.2.4 the construction of new trunk and lateral sewers to provide an extension of service from an existing collection system or the rehabilitation of existing sewers, which rehabilitation will not eliminate excessive infiltration/inflow.

2.1.2.5 The construction of a new collection system and treatment works to service a presently unsewered community where a discharge of raw of partially treated sewage exists, or where no discharge exists.

2.2 Specific Determination of the Grant Priority Index

2.2.1 Based on the above assignment of values, a multiplication factor to convert a MDI or GPI, namely F4, is derived through a summation of the assigned values for the need:

F4 = Point values assigned for additional treatment processes required

+ currently overloaded facilities

+ rehabilitation

Specifically, the established F4 values are the following:

TABLE OF F4 VALUES

Treatment Process	Average Dry Weather Flow	Maximum Dry Weather Flow	Maximum Wet Weather Flow
Primary	0	0	8
Secondary	14	10	0
Tertiary (10/12)	8	6	0
Advanced (4/5)	4	2	0
Disinfection	6	6	6
Phosphorus Removal	5	3	0
Nitrification	8	6	0
Inadequate Sludge Processing Facilities			6
Modifications of existing processes which do not increase capacity or degree of treatment			1
or			
Wastewater reuse or recycling; Flood Control Projects; Trunk and Lateral Sewers			1

Range of Values: 0 to 99

2.2.2 F5 is a factor which is added to the raw GPI value for those needs whose priority position is to be retained (reference Sections 0.4.1 and 0.5.3).

The value of F5 will be retained only if the value of the quantity F1 x F2 x F3 x F6 x F4 is greater than the corresponding quantity for the lowest priority need which has a F5 value greater than zero.

If the value of this quantity does not meet this test, F5 for the need will be reduced to zero following the completion of facility planning and subsequent determination of F6.

2.2.3 After the value of F4 is determined, the GPI value for each need is calculated:

GPI = Grant Priority Index

= MDI x F4 + F5

2.3 Range of Values

Range of values: ____ - ____

Needs are ranked for grant funding priority in decreasing order of GPI value; thus, the larger the GPI value, the higher the grant priority.

2.4 Scoring Conventions

Specifically, the priority system just described is applied with the following conventions and general results (see Appendix B to this document for examples of each of the following general cases):

2.4.1 Expansion and/or upgrading of an existing sewage treatment plant, or construction of a new sewage treatment plant, or sewer rehabilitation work to eliminate excessive infiltration/inflow.

2.4.1.1 expansion and/or upgrading of an existing sewage treatment plant, a new sewage treatment plant to serve a currently sewered area, or sewer rehabilitation work which will eliminate excessive infiltration/inflow: the MDI value for the plant, together with the F4 value for the treatment processes affected at the plant* are used to calculate the GPI value for the need.

2.4.1.2 construction of a new sewage treatment plant OR IMPROVEMENTS TO EXISTING INDIVIDUAL SEWAGE DISPOSAL UNITS OR A COMBINATION OF THE TWO for a currently unsewered community: since a quantifiable discharge does not exist, an "equivalent" MDI value must be calculated. For this purpose, the estimated current population equivalent of the area to be served is used in calculating F1; F2 is set equal to 1.0; and the segment to receive the proposed discharge determines F3. A significance factor to reflect the impact of the discharge on the receiving stream and public health hazards is determined as described in 1.2.4.2 to calculate F6. The MDI is then calculated (MDI = F1 x F2 x F3 x F6). The treatment processes required at the proposed sewage treatment plant determine F4. The GPI is then calculated (GPI = MDI x F4).

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* treatment processes affected at the plant for sewer rehabilitation projects:

1. where the sewer rehabilitation work will solve an inflow problem, the F4 value shall be determined from the existing need ** for provision of adequate primary treatment and/or disinfection for wet weather flow in excess of maximum dry weather flow, unless additional treatment is required to meet effluent standards.

2. where the sewer rehabilitation work will solve an infiltration problem, the F4 value shall be determined from the existing need** for provision of adequate primary and/or secondary and/or tertiary and/or advanced and/or supplemental treatment of dry weather flow.

3. where the sewer rehabilitation work will solve an infiltration and inflow problem, the F4 value shall be determined from the existing need** for provision of adequate primary and/or secondary and/or tertiary and/or advanced and/or supplemental treatment of dry weather flow as well as the existing need for provision of primary and/or disinfection of wet weather flow in excess of maximum dry weather flow, unless additional treatment of the excess flow is required to meet effluent standards.

** Existing need should be determined using overload/no overload criteria for existing treatment processes and dilutation ratio for additional processes required by effluent standards.

2.4.1.3 construction of a new regional plant or expansion and/or upgrading of an existing sewage treatment plant to phase out one or more existing sewage treatment plants: the highest of the MDI values as well as the highest of the F4 values among the values for the existing or proposed regional plant and the values for the existing or proposed regional plant and the values for the existing or proposed regional plant and the values for the existing plant(s) to be phased out (exclusive of non-municipally owned treatment works) are used to calculate the GPI for the regional plant.

2.4.1.4 construction of a new sewage treatment plant OR IMPROVEMENTS TO INDIVIDUAL EXISTING SEWAGE DISPOSAL UNITS OR A COMBINATION OF THE TWO for a currently unsewered community where a discharge of raw or partially treated sewage does exist.* An "equivalent" MDI must be calculated. For this purpose, estimated current population equivalent of the area to be served is used in calculating F1; F2 is set equal to 1.0 (2.0 after completion and approval of the facilities plan); and the segment to receive the proposed discharge determines F3.

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* A point discharge of raw or partially treated sewage exists, for purposes of determing priority, if the applicant establishes that the PE** (BOD) of the discharge from the sewer system is at least equal to 65 percent of the total domestic population plus 100 percent of any tributary industrial PE** (BOD), on the basis of no less than three samples (24 hour composite) of the discharge, collected directly from the "sewer system" outfall to the receiving stream and corresponding comparable flow measurements of the discharge, on different days. Copies of laboratory reports must be submitted as a part of the facilities planning documents to permit a need to quality under these criteria, and an on-site investigation by Agency representatives may be made, in which case the Agency investigation results will be considered conclusive for scoring purposes.

** see single asterisk on page 8.

Significance factor to reflect the impact of the discharge on the receiving stream and public health hazards is determined as described in 1.2.4.2 to calculate F6.

The MDI is then calculated (MDI = F1 x F2 x F3 x F6). The GPI is then calculated (GPI = MDI x F4).

2.4.2 Construction of a intercepting sewer:

2.4.2.1 relief intercepting sewers, where the existing intercepting sewer is not capable of transporting the flows which are presently tributary to it:

2.4.2.1.1 relief sanitary intercepting sewer: proceed in a manner identical to that in 2.4.1.1 above.

2.4.2.1.2 relief combined intercepting sewer: proceed in a manner identical to that in 2.4.3 below.

2.4.2.2 transport of sewage from end point(s) of existing collection system(s) to an existing or proposed regional sewage treatment plant: proceed in a manner identical to the procedure in Section 2.4.1.3 above.

2.4.2.3 transport of sewage from end point(s) of proposed collection system(s) to an existing or proposed regional treatment plant OR IMPROVEMENTS TO INDIVIDUAL EXISTING SEWAGE DISPOSAL UNITS OR BOTH: the calculation of the F1, F2 and F6 values proceeds similarly to that in Section 2.4.1.2 above. The F4 value will be selected from the larger of the values for the degree(s) of treatment which would be required at the local location of the collection system and at the regional plant. The F3 value will also be selected from the larger of the values(s) for the basin segment containing the collection system and the basin segment containing the regional plant.

2.4.2.4 construction of a intercepting sewer OR IMPROVEMENTS TO EXISTING INDIVIDUAL SEWAGE DISPOSAL UNITS OR BOTH for a currently unsewered community where a discharge of raw or partially treated sewage does exist.* A MDI value (Municipal Discharge Index) does not exist, and an "equivalent" MDI must be calculated. For this purpose, estimated current population equivalent of the area to be served is used in calculating F1; F2 is set equal to 1.0 (2.0 after completion and approval of the facilities plan); and the segment to receive the proposed discharge determines F3. The MDI is then calculated (MDI = F1 x F2 x F3 x F6). The treatment processes required at the proposed sewage treatment plant determine F4. The immediate impact of the discharge on the receiving stream and public health hazard are used as described in 1.2.4.2 to calculate F6. The GPI is then calculated (GPI = MDI x F4).

2.4.3 Elimination or treatment of on-system wet weather overflow(s) from combined sewers: regardless of the approach to a solution of this problem or the extensiveness of the problem, the MDI for the plant currently providing service, and as F4 value of 14 (established values for primary treatment and disinfection of maximum wet weather flow) are used in the calculation of a GPI value.

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* See single asterisk on page 18.

2.4.4 Construction of trunk and lateral sewers:

2.4.4.1 rehabilitation work which will not eliminate excessive infiltration/inflow: the MDI value for the plant, together with an F4 AND F6 values of 1 are used to determine the GPI value, and therefore, GPI = MDI.

2.4.4.2 complete new collection system: the GPI value will be equal to that of the proposed plant (reference 2.4.1.2) or intercepting sewer (reference 2.4.2.2).

2.4.4.3 extension of service by an existing collection system: the calculation of the MDI value proceed similarly to that in Section 2.4.2.2, except that in this case an estimate of the existing population equivalent to be served by the sanitary sewer extension only is used in determining F1. The F4 AND F6 values for this case are equal to 1, and then GPI = MDI.

2.4.5 Contruction of an intercepting sewer for transport of wastes from water treatment plants:

In this case the population equivalent based on suspended solids*** is used in place of the population equivalent based on a Biochemical Oxygen Demand. In the case of a need to provide treatment of such wastes where none is presently provided, a value of 2.0 is used for F2 in the calculation of MDI and then GPI = MDI x F4.

2.4.6 Construction of an intercepting sewer parallel to an existing intercepting sewer which existing sewer is capable of transporting the flows which are presently tributary to it; flood control projects; and wastewater recycling or wastewater reuse projects: the MDI value for the plant, together with an F4 value of 1 are used to determine the GPI value, and therefore, GPI = MDI.

*** 1 PE_{SS} equals 0.22 lbs. of suspended solids per day.

3.0 ADDITIONAL CONSIDERATIONS

3.1 Effects of Overloading

For an overloaded facility, values from the table of F4 values for the average and maximum design flow for existing treatment processes (as well as 6 points for sludge handling facilities) will be assigned to the need.

For a facility which is not overloaded as defined above, but where sludge drying bed capacity is presently inadequate, 6 points for sludge handling facilities will be assigned to the need. Sludge beds will be determined to be inadequate where the connected population equivalent (for a 12 month period) exceeds the Agency approved and permitted design basis of the sludge drying beds.

If the facility is not overloaded based on the average daily flow, the need may receive credit for overloading on the maximum dry weather flow. Where the applicant justifies, on the basis of influent flow measurement for a 12 month period that the average of the peak dry weather flows to the plant exceeds the design peak capacity of the plant for complete treatment of dry weather flow, the need will receive credit for overloading under maximum dry weather flow conditions.

3.2 On Going Construction

At the time of scoring of a need for priority, in situations where other construction has been completed for expansion of capacity and/or increased degree of treatment, the priority score will not include the need for the processes which have been constructed if, at the time of the application filing deadline, the approved estimate of work in pace indicates 100 percent completion of all portions of the contract except miscellaneous work.

Needs which consist of plant improvements and/or intercepting sewers, and which will be satisfied through construction of several phases (projects), will be addressed by scoring all phases (projects) with the full credit for the entire need.

3.3 Flow Diversion

Needs which consist of the diversion of a significant portion of the average dry weather flow from one plant to another plant will be scored utilizing the regionalization convention for the two plants.

3.4 Integrally Related Projects

3.4.1 Two or more needs of one or more applicants, which are initially ranked at different priorities, may be consolidated into one need at the higher (highest) priority, if the following conditions are satisfied.

3.4.1.1 The facilities plan, prepared by an applicant and approved by the Agency, must conclude that the two or more needs are integrally related through the cost-effective solution.

3.4.1.2 Available State and Federal funds must be adequate to permit complete funding of the consolidated need.

3.4.2 Such consolidations may include:

3.4.2.1 sewer rehabilitation work and sewage treatment plant improvements and/or intercepting sewer construction;

3.4.2.2 projects to eliminate on-system wet weather overflow and sewage treatment plant improvements and/or intercepting sewer construction;

3.4.2.3 projects to construct collection systems and new sewage treatment plant and/or intercepting sewer construction.

3.4.3 This provision does allow the award of grants (for projects which are integrally related to a priority project), to municipalities which had not filed an application for grant at the time of preparation of the priority list for the fiscal year.

3.5 Complete Waste Treatment Systems

After Agency approval of a facilities plan, and at the time of the subsequent revision to the priority list, the Agency shall add any previously unidentified needs to the priority list if the needs are not included in the scope of work for which a Step 2 or Step 3 grant has been offered, even if the applicant has not filed an application for such needs. Failure of the applicant to file application for such previously identified needs shall not restrict the Agency in adding the needs to the priority list.

APPENDIX C

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF WATER POLLUTION CONTROL
PROCEDURE FOR CALCULATING THE SEGMENT RANKING INDICES (SRI)
FISCAL YEAR 1977

REGULATIONS PROMULGATED TO IMPLEMENT THE FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972 INTRODUCED A GEOGRAPHIC CONCEPT: THE SEGMENT. AS DEFINED, A SEGMENT IS A PORTION OF A RIVER BASIN "THE SURFACE WATERS OF WHICH HAVE COMMON HYDROLOGIC CHARACTERISTICS OR FLOW REGULATION PATTERNS: COMMON NATURAL PHYSICAL, CHEMICAL, AND BIOLOGICAL PROCESSES, AND WHICH HAVE COMMON REACTIONS TO EXTERNAL STRESSES, E.G., DISCHARGE OF POLLUTANTS".

ILLINOIS RIVER BASINS HAVE BEEN DIVIDED INTO A TOTAL OF 123 SEGMENTS WHICH, TAKEN TOGETHER, COVER THE ENTIRE STATE. EACH SEGMENT IS IDENTIFIED BY AN ALPHANUMERIC CODE. "A"-TYPE SEGMENTS GENERALLY IDENTIFY MAJOR TRIBUTARY SUB-BASINS OR PORTIONS THEREOF; "B"-TYPE SEGMENTS ARE PORTIONS OF THE MAIN STEM OF THE PRINCIPAL RIVER IN THE BASIN AND THE DRAINAGE AREAS OF MINOR TRIBUTARIES TO THAT PORTION OF THE MAIN STEM.

A. IN ACCORDANCE WITH 40 CFR 35.915(c)(1) OF THE FEBRUARY 11, 1974 CONSTRUCTION GRANT REGULATIONS, THE STATE SHALL CONSIDER THE FOLLOWING FOUR ITEMS IN DETERMINING WHICH PROJECTS TO FUND.

   1. SEVERITY OF POLLUTION;
   2. POPULATION AFFECTED;
   3. THE NEED FOR PRESERVATION OF HIGH QUALITY WATERS; AND
   4. NATIONAL PRIORITIES AS DETERMINED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA) ADMINISTRATOR.

IN ORDER TO ARRIVE AT AN OBJECTIVE DETERMINATION OF SEGMENT PRIORITY RATING, THE FOUR CRITERIA ARE EXPRESSED AS NUMERICAL VALUES, BASED ON AVAILABLE DATA. THE NUMERICAL VALUES ARE IN TURN COMBINED TO ESTABLISH A RANKING INDEX FOR EACH OF THE BASIN SEGMENTS.

THE FOLLOWING PARAGRAPHS OUTLINE THE STEP-BY-STEP PROCEDURE USED IN THIS PROCESS.

A. SEVERITY OF POLLUTION PROBLEMS

THIS CRITERION HAS BEEN SELECTED AS THE BASIC SEGMENT RANKING PARAMETER. IT IS INTERPRETED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY AS THE MEASURED VALUE OF CERTAIN CRITICAL WATER QUALITY PARAMETERS IN THE WATERS OF THE STATE, COMPARED WITH THE APPLICABLE ILLINOIS POLLUTION CONTROL BOARD WATER QUALITY STANDARDS FOR THOSE PARAMETERS. THE PROCEDURE OF ASSESSING WATER QUALITY PROBLEMS CONSISTS OF TWO PARTS:

PART 1 AVERAGING THE 1974 and 1975 SAMPLE DATA FOR EACH OF 5 KEY PARAMETERS (DISSOLVED OXYGEN, FECAL COLIFORM BACTERIA, AMMONIA NITROGEN, TOTAL DISSOLVED SOLIDS, AND NITRATE PLUS NITRITE NITROGEN)*

PART 2 DETERMINING THE PERCENTAGE OF THE AVERAGE OF 1974 AND 1975 SAMPLES WHICH INDICATED VIOLATIONS OF APPLICABLE WATER QUALITY STANDARDS FOR DISSOLVED OXYGEN, AMMONIA NITROGEN, FECAL COLIFORM BACTERIA, TOTAL DISSOLVED SOLIDS, AND pH*

PARTS 1 AND 2 PRODUCE 10 PARAMETER VALUES FOR EACH STATION. THE 10 SETS OF DATA ARE THEN ARRANGED IN ORDER OF SEVERITY AND GIVEN A RANK NUMBER. THESE NUMBERS ARE SUBSEQUENTLY COMBINED TO COMPUTE A WATER QUALITY INDEX FOR EACH STATION, ACCORDING TO THE FOLLOWING FORMULA:

$$S = \frac{1}{2}(R_A + R_V)_{Amm} + \frac{1}{2}(R_A + R_V)_{Fec\ Col}$$

$$+ \frac{1}{2}(R_A + R_V)_{TDS} + R_{V_{pH}} + R_{A_{N+N}}$$

WHERE:

S = "WATER QUALITY INDEX" VALUE FOR A GIVEN STATION

R_A = RANK NUMBER BY AVERAGE VALUE FOR A GIVEN STATION AND PARAMETER

R_V = RANK NUMBER BY PERCENT VIOLATIONS OF WATER QUALITY STANDARDS FOR A GIVEN STATION AND PARAMETER

Amm, DO, Fec Col, TDS, pH, N+N = PARAMETER DESIGNATION SUBSCRIPTS

THE S VALUES FOUND FOR EACH STATION ARE USED AS A BASIS FOR DETERMINING A WATER QUALITY INDEX VALUE FOR THE BASIN SEGMENTS. THIS PROCESS REQUIRES THE AVERAGING OF S_{Sta} VALUES FOR EACH SEGMENT ACCORDING TO THE FOLLOWING FORMULA:

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* THE PARAMETER pH (RELATIVE ACIDITY) IS NOT CONSIDERED IN PART 1 BECAUSE ITS NATURE IS SUCH THAT AN "AVERAGE" pH IS GENERALLY MEANINGLESS AS AN EXPRESSION OF WATER QUALITY. NITRATE PLUS NITRITE NITROGEN IS NOT CONSIDERED IN PART 2 BECAUSE THERE IS NO NUMERICAL STANDARD WHICH APPLIES FOR MOST WATER QUALITY SAMPLING STATIONS.

$$WQI = (S_1 + S_2 + S_3 + . . . + S_N) /N$$

WHERE WQI = SEGMENT WATER QUALITY INDEX VALUE = AVERAGE OF STATION S VALUES FOR THE SEGMENT, AND

N = NUMBER OF STATIONS IN THE SEGMENT

THE WQI VALUES FOUND IN THIS MANNER ARE SUBSEQUENTLY ADJUSTED FOR THE THREE OTHER CRITERIA CONSIDERED IN THE RANKING PROCESS. IN THE FOLLOWING PARAGRAPHS, THE METHODS OF OBTAINING THE ADJUSTMENT FACTORS ARE DISCUSSED IN DETAIL.

B. POPULATION AFFECTED

OPERATIONALLY, "POPULATION AFFECTED" IS DEFINED AS BEING THE 1970 U.S. CENSUS POPULATION OF THE SEGMENT EXCEPT WHERE SIGNIFICANT INTER-SEGMENT TRANSFERS TO SEWAGE OCCUR IN WHICH CASE THE ESTIMATED POPULATION WHOSE SEWAGE IS TRIBUTARY TO THE SEGMENT IS ADDED TO THE RESIDENT POPULATION OF THE SEGMENT. THIS "POPULATION AFFECTED" IS USED TO ADJUST THE SEGMENT WQI VALUE DETERMINED BY THE PREVIOUSLY DESCRIBED PROCEDURE. THE RATIONALE UNDERLYING THIS APPROACH IS THAT (1) THE POPULATION MOST AFFECTED BY THE WATER QUALITY, OR LACK OF SAME, IS THAT WHICH RESIDES IN THE SEGMENT IN WHICH THE POLLUTION SOURCES OCCUR: AND (2) THE RANKING OF SEGMENTS IS INTENDED TO ESTABLISH PRIORITIES FOR POLLUTION ABATEMENT PROGRAMS. THE POPULATION MOST AFFECTED BY PROGRAMS TO IMPROVE WATER QUALITY WOULD BE THAT OF THE SEGMENT IN WHICH SUCH PROGRAM IS IMPLEMENTED. ON THE BASIS OF THIS REASONING, POPULATIONS ARE COMPUTED FOR EACH SEGMENT AND CONVERTED INTO AN ADJUSTMENT FACTOR.

POPULATION FIGURES OF THE INCORPORATED AND UNINCORPORATED COMMUNITIES ARE RECORDED FOR EACH SEGMENT. WHERE A SEGMENT BOUNDARY SPLITS A TOWNSHIP, THE UNINCORPORATED POPULATION WITHIN THE SEGMENT IS PRORATED BY APPLYING A PERCENTAGE OF THE TOWNSHIP POPULATION EQUAL TO THE RATIO OF THE SEGMENT AREA IN THE TOWNSHIP TO THE TOTAL TOWNSHIP AREA. THE POPULATIONS OF THE VARIOUS POLITICAL SUBDIVISIONS WITHIN EACH SEGMENT ARE TOTALED.

THE FOLLOWING "POPULATION FACTORS" ARE APPLIED AS MULTIPLIERS TO THE WATER QUALITY INDEX VALUES:

SEGMENT POPULATION	FACTOR
0 - 20,000	1.00
20,001 - 50,000	1.05
50,001 - 100,000	1.10
OVER 100,000	1.20